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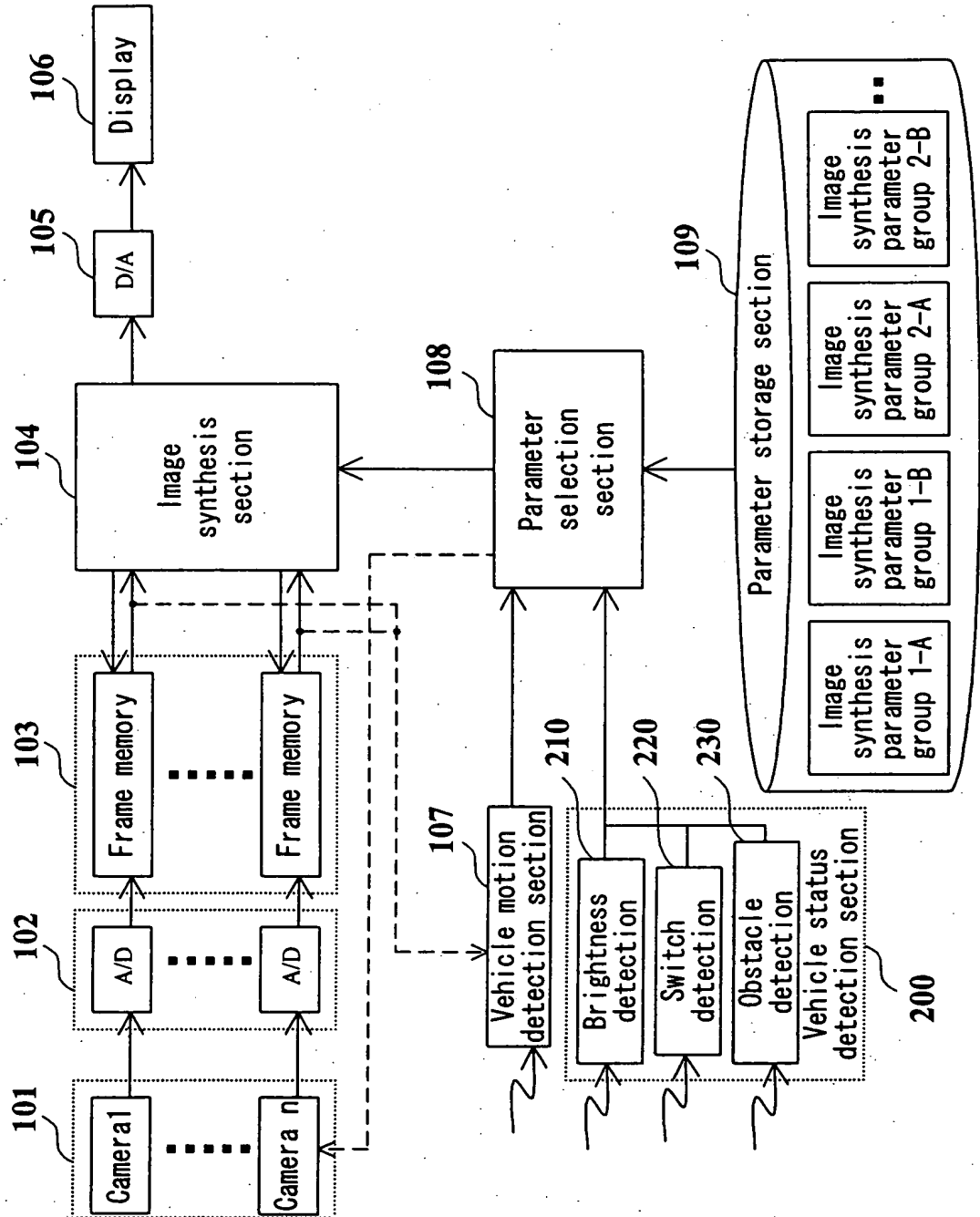
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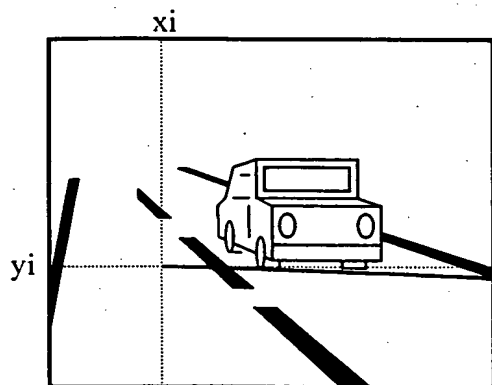
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FIG. 1



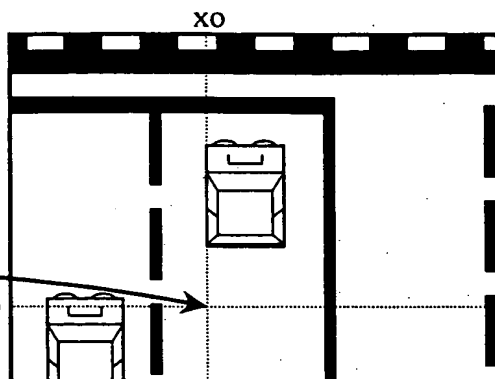
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FIG. 2A



Camera image (Camera 1)

FIG. 2B



Synthesized image

FIG. 2C

| Camera No. | X coordinate | Y coordinate |
|------------|-----------------|-----------------|
| 1 | x_i | y_i |

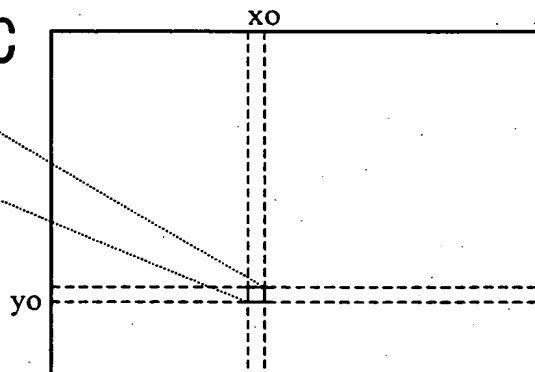


Image synthesis parameter group

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FIG. 3

| Input | Output |
|-------------------|---------------------------------|
| Vehicle speed | Image synthesis parameter group |
| Less than 10 km/h | Frame base |
| 10 km/h or more | Field base |

FIG. 4

| Input | Output | |
|-------------------|---------------------------------|--------------------------|
| Vehicle speed | Image synthesis parameter group | Capture pattern |
| Less than 10 km/h | Frame base | Non-interlace, 1/30 sec. |
| 10~30km/h | Field base | Interlace, 1/60 sec. |
| 30 km/h or more | Field base | Interlace, 1/120 sec. |

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FIG. 5

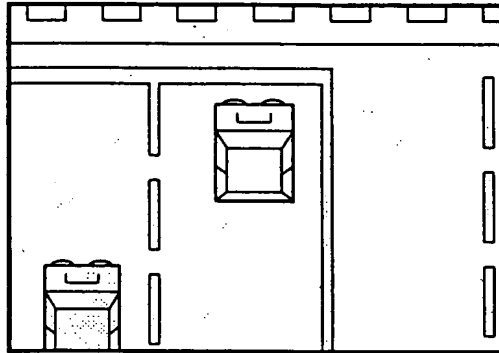
| Input | | Output | |
|------------|-------------------|---------------------------------|--------------------------|
| Brightness | Vehicle speed | Image synthesis parameter group | Capture pattern |
| Bright | Less than 10 km/h | Frame base | Non-interlace, 1/30 sec. |
| | 10~30km/h | Field base | Interlace, 1/60 sec. |
| | 30 km/h or more | Field base | Interlace, 1/120 sec. |
| Dark | Less than 10 km/h | Frame base | Non-interlace, 1/30 sec. |
| | 10~30km/h | Field base | Non-interlace, 1/30 sec. |
| | 30 km/h or more | Field base | Interlace, 1/60 sec. |

FIG. 6

| Input | | | Output |
|---------------------|------------------------|-------------------|---------------------------------|
| Selection by driver | Distance from obstacle | Vehicle speed | Image synthesis parameter group |
| Composition A | — | Less than 10 km/h | Frame base for composition A |
| | | 10 km/h or more | Field base for composition A |
| Composition B | — | Less than 5 km/h | Frame base for composition B |
| | | 5 km/h or more | Field base for composition B |
| Automatic | Less than 1 m | Less than 5 km/h | Frame base for composition B |
| | | 5~10km/h | Field base for composition B |
| | | 10 km/h or more | Field base for composition A |
| | 1 m or more | Less than 10 km/h | Frame base for composition A |
| | | 10 km/h or more | Field base for composition A |
| | | | |

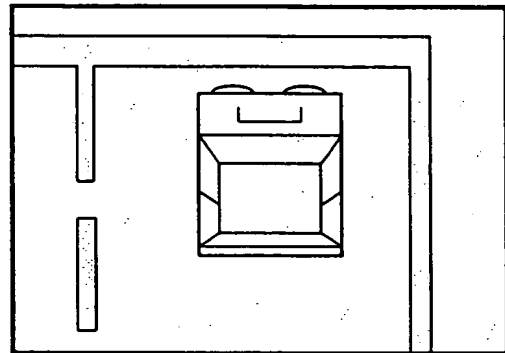
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FIG. 7A



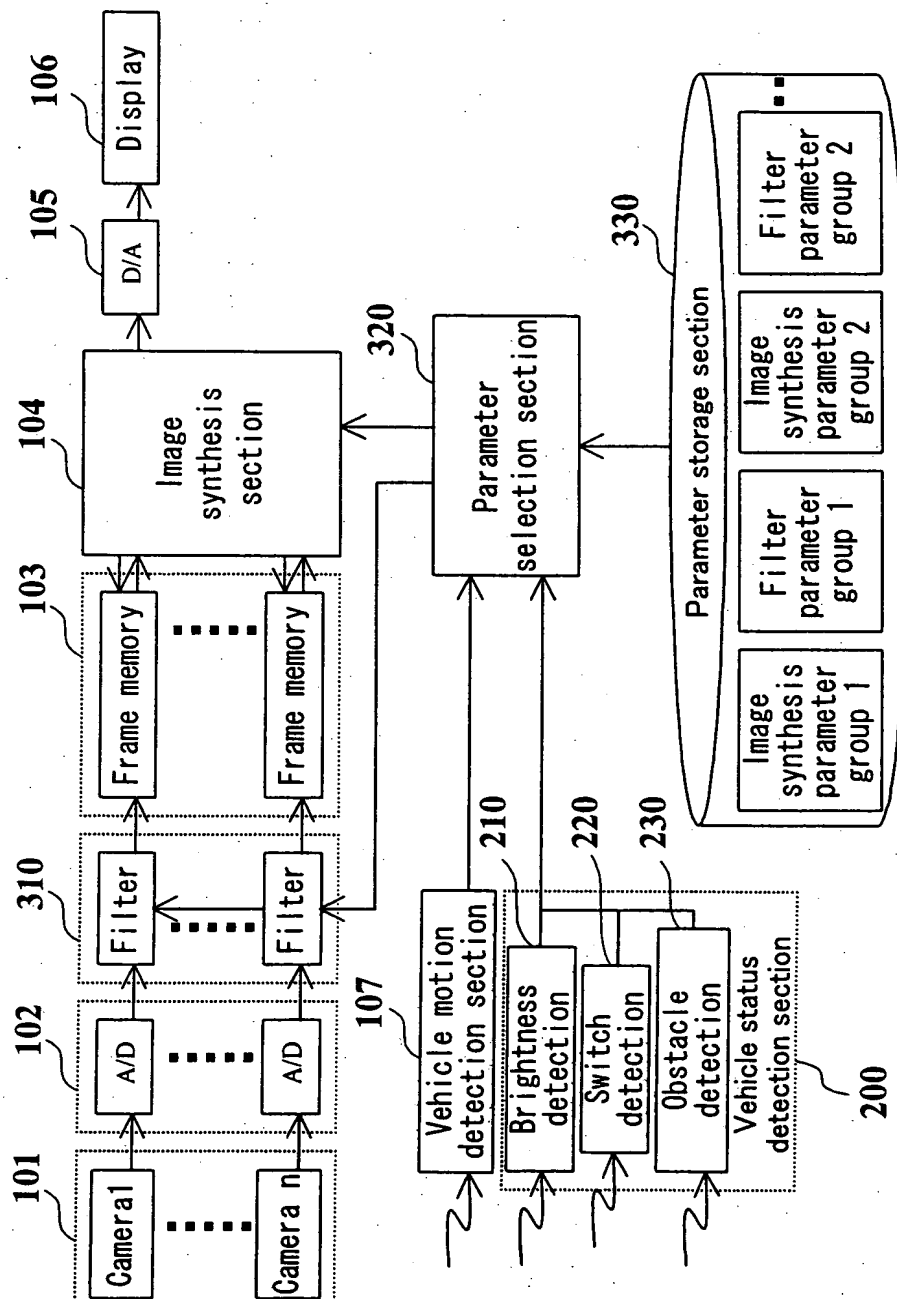
Composition A

FIG. 7B



Composition B

FIG. 8



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FIG. 9

| Camera No. | Cut-off frequency |
|------------|-------------------|
| Camera 1 | $1/4f_s$ |
| Camera 2 | $1/4f_s$ |
| Camera 3 | $1/2f_s$ |
| Camera 4 | $1/2f_s$ |

FIG. 10

| Input | | Output | |
|---------------------|-------------------|---------------------------------|------------------------|
| Selection by driver | Vehicle speed | Image synthesis parameter group | Filter parameter group |
| Composition A | — | 1 | 1 |
| Composition B | — | 2 | 2 |
| Automatic | Less than 10 km/h | 1 | 1 |
| | 10 km/h or more | 2 | 2 |

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FIG. 11A

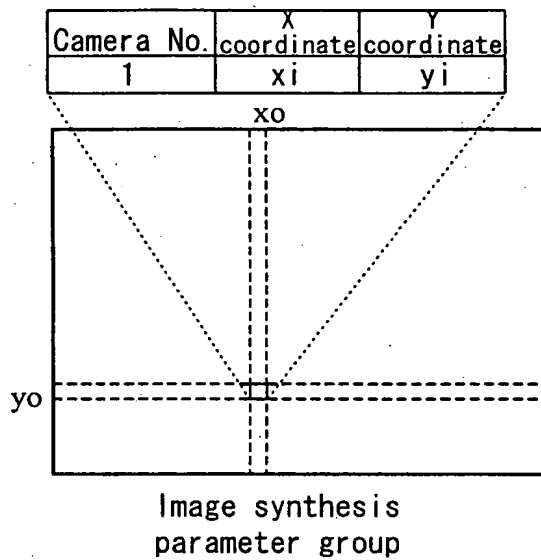
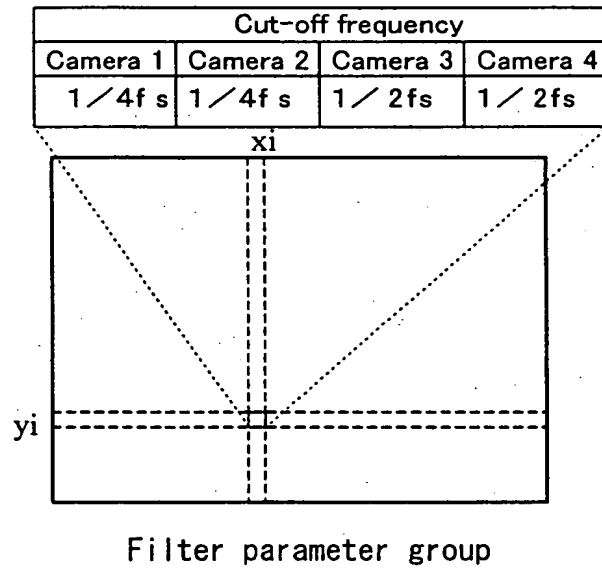
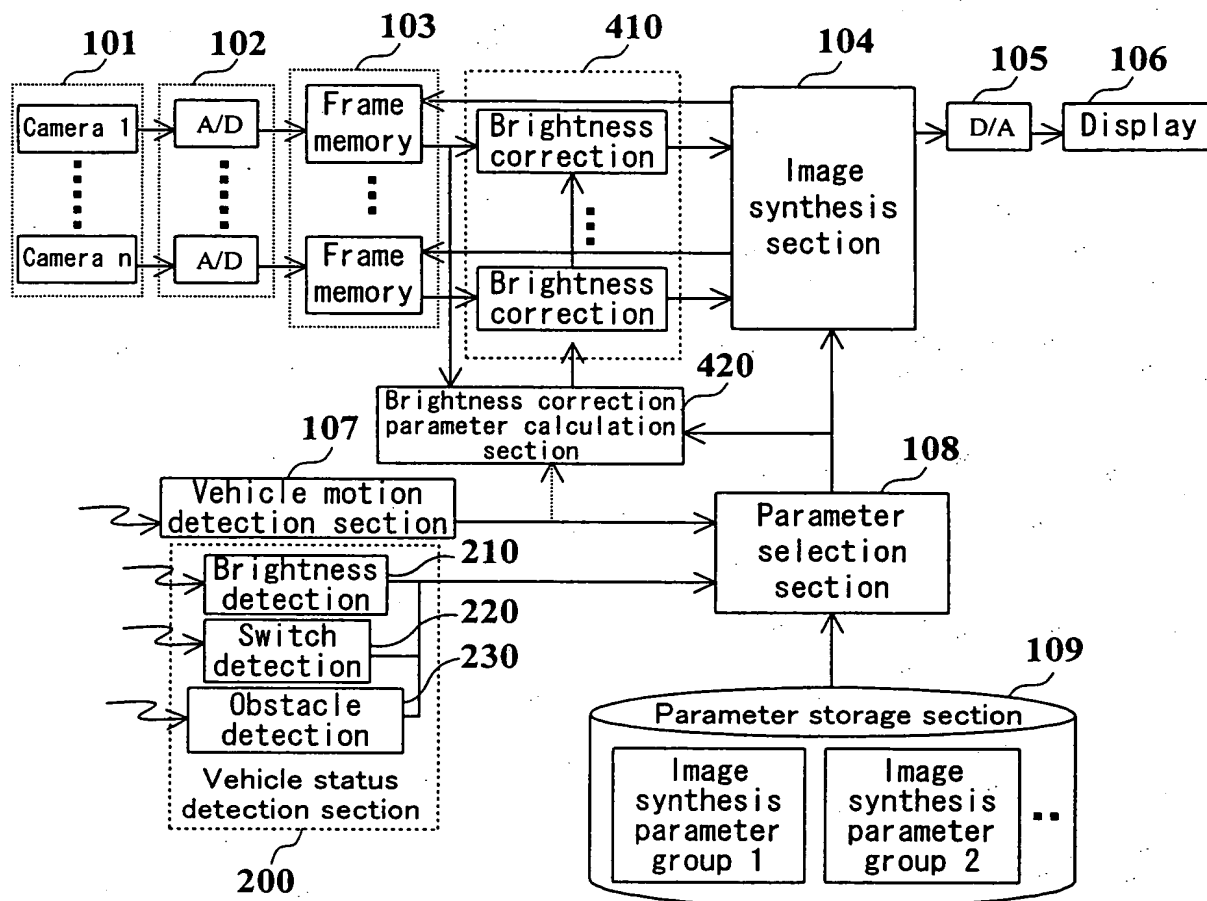


FIG. 11B



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FIG. 12



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FIG. 13A

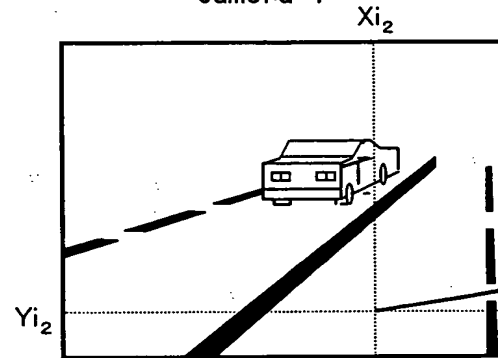
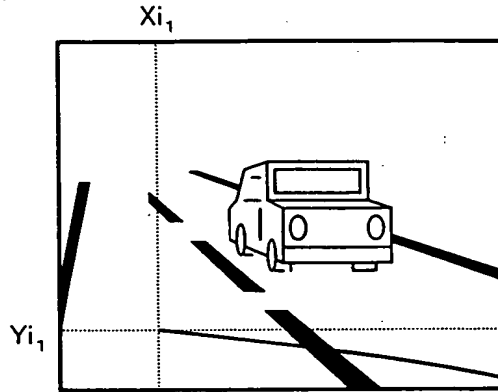


FIG. 13B

Camera 2

FIG. 13C

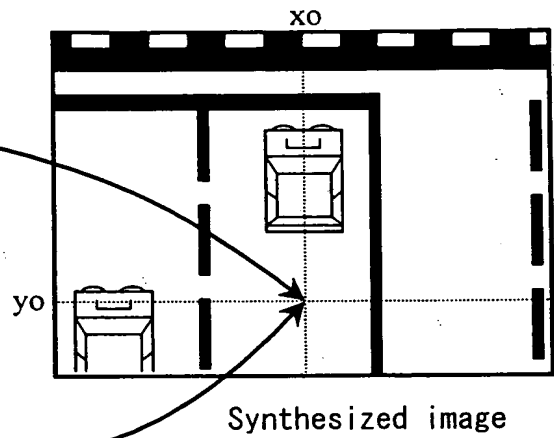


FIG. 13D

| Camera No. | X coordinate | Y coordinate | Weight |
|------------|--------------|--------------|--------|
| 1 | X_{i1} | Y_{i1} | 0.7 |
| 2 | X_{i2} | Y_{i2} | 0.3 |

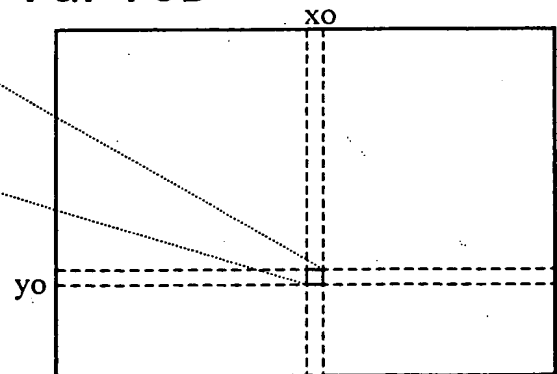


Image synthesis
parameter group

FIG. 14A

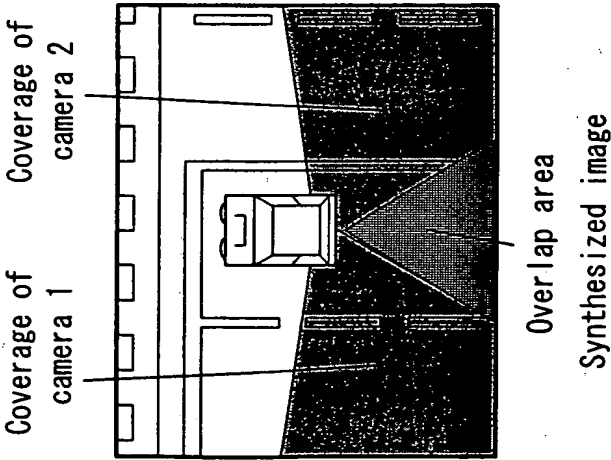
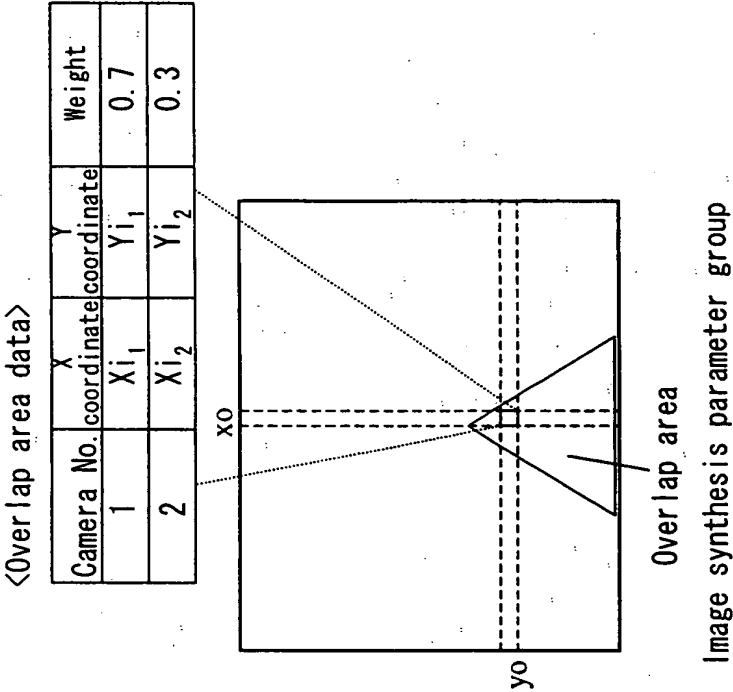
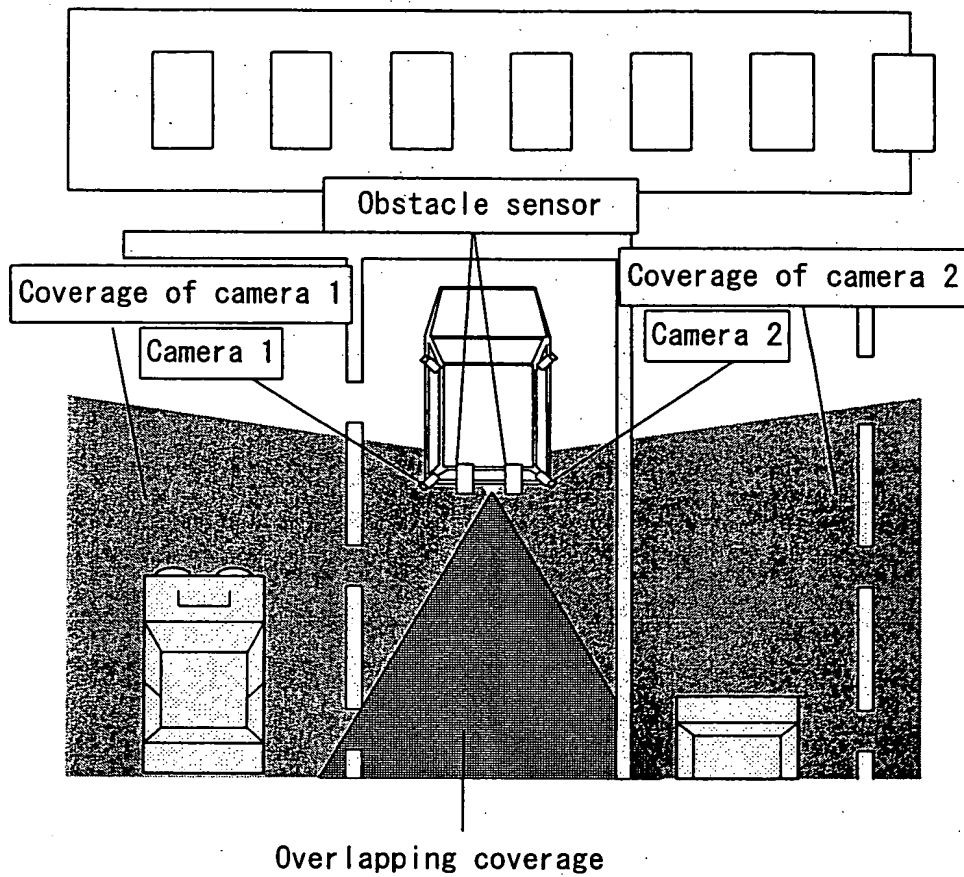


FIG. 14B



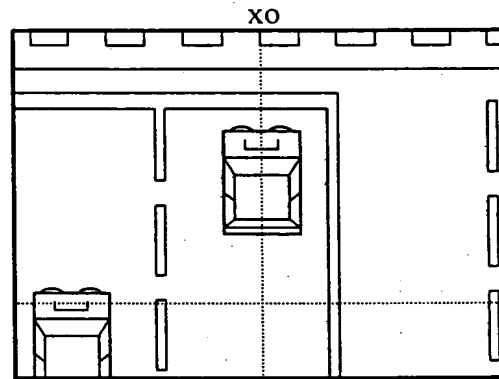
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FIG. 15



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FIG. 16A



Synthesized image

| Camera No. | X coordinate | Y coordinate |
|------------|-----------------|-----------------|
| 1 | x_1 | y_1 |

FIG. 16B

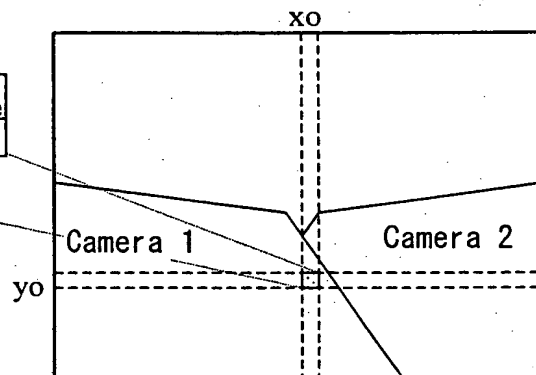


Image synthesis parameter group A

| Camera No. | X coordinate | Y coordinate |
|------------|-----------------|-----------------|
| 2 | x_{i2} | y_{i2} |

FIG. 16C

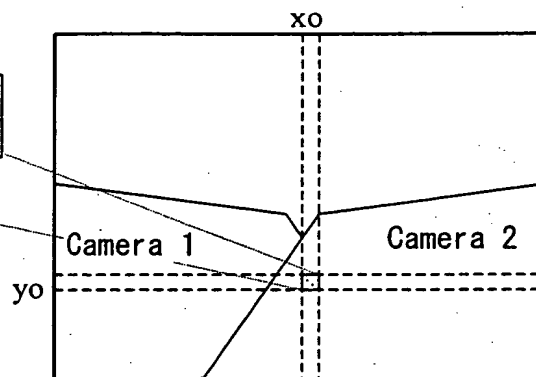


Image synthesis parameter group B

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FIG. 17A

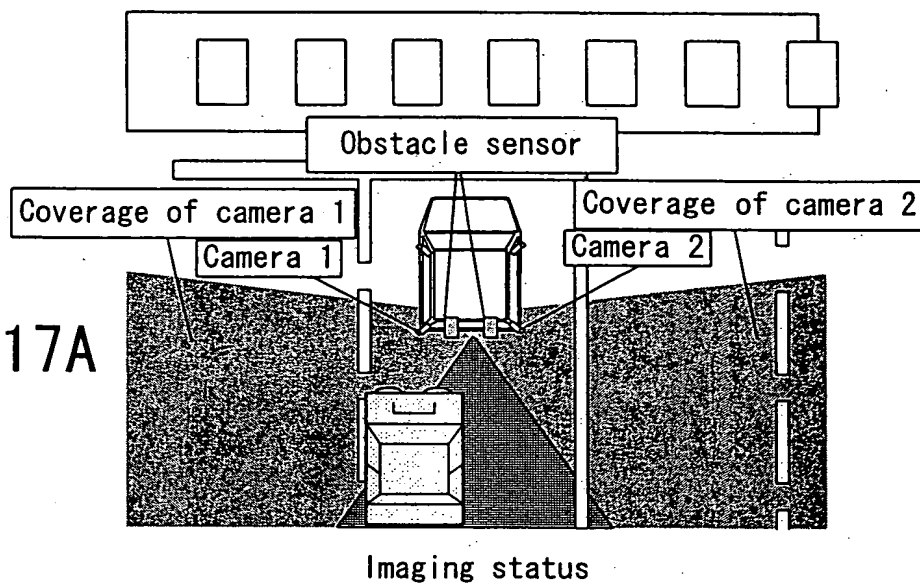


FIG. 17B

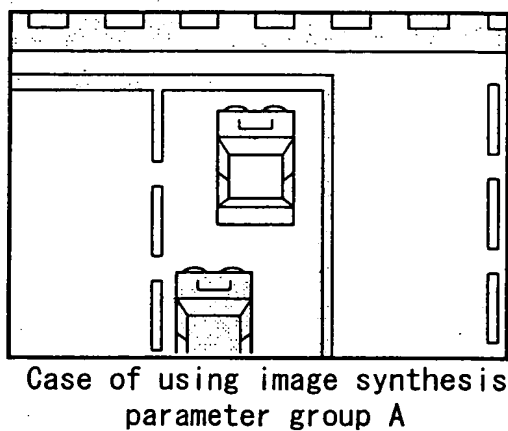
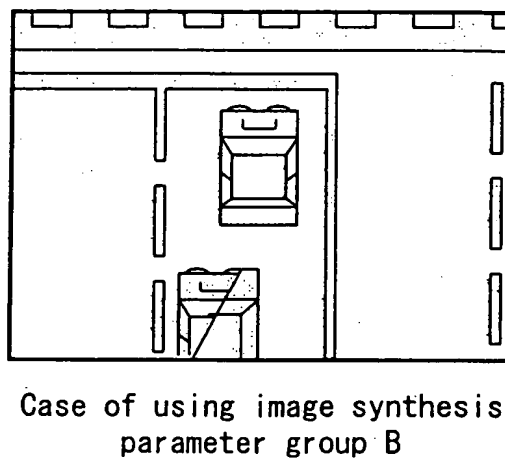


FIG. 17C



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FIG. 18

| Camera No. | X coordinate | Y coordinate | Weight | |
|------------|-----------------|-----------------|--------|-----|
| | | | A | B |
| 1 | X_{i_1} | Y_{i_1} | 0.7 | 0.2 |
| 2 | X_{i_2} | Y_{i_2} | 0.3 | 0.8 |

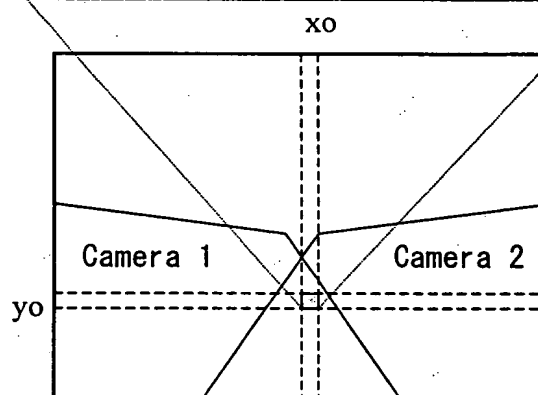
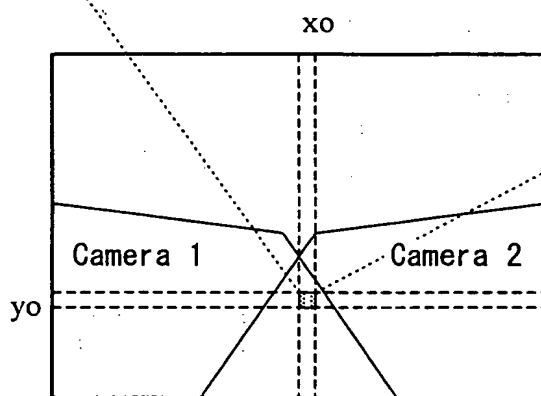


Image synthesis parameter group

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FIG. 19

| Camera No. a | X coordinate a | Y coordinate a | Camera No. b | X coordinate b | Y coordinate b | Weight reference No. |
|-----------------|----------------------|----------------------|-----------------|----------------------|----------------------|-------------------------|
| 1 | X_{i_1} | Y_{i_1} | 2 | X_{i_2} | Y_{i_2} | 3 |



| Weight reference No. | Weight | | | |
|----------------------------|-------------|-------------|-------------|-------------|
| | A | | B | |
| | Camera a | Camera b | Camera a | Camera b |
| 1 | 1.0 | 0.0 | 0.0 | 1.0 |
| 2 | 0.8 | 0.2 | 0.1 | 0.9 |
| 3 | 0.7 | 0.3 | 0.2 | 0.8 |
| ⋮ | | | | |

Image synthesis parameter group

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FIG. 20A

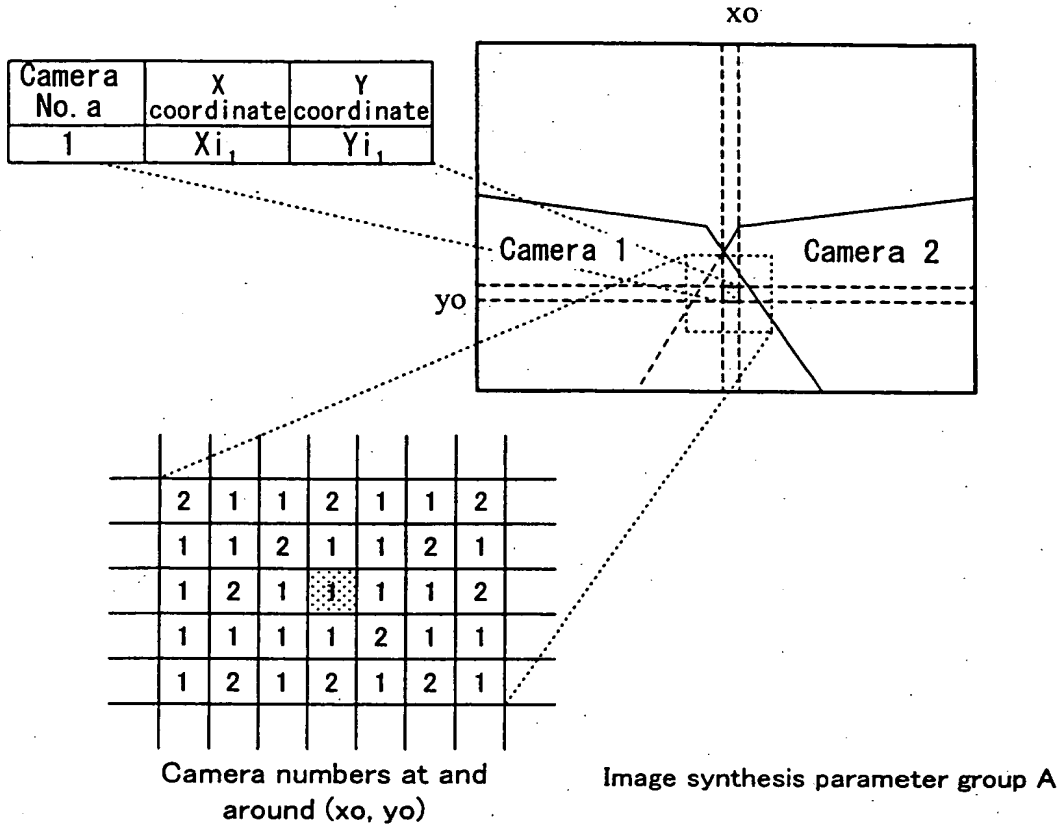
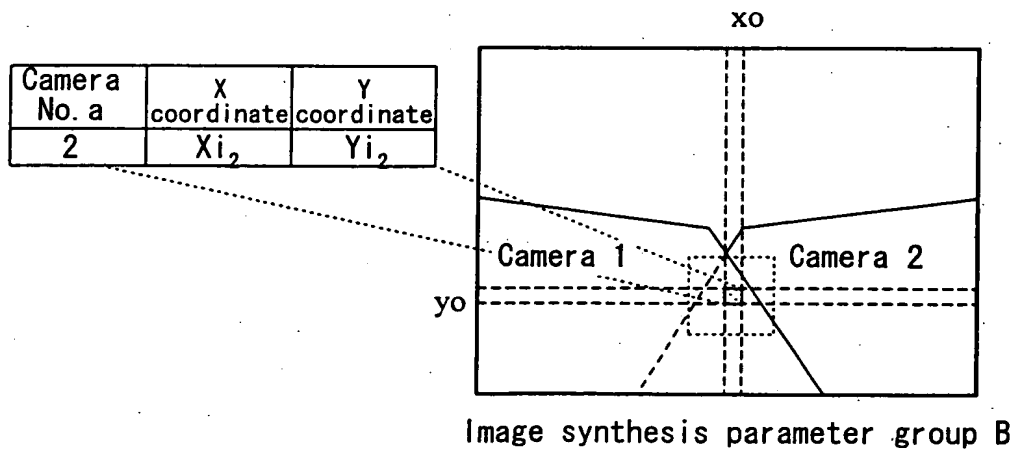
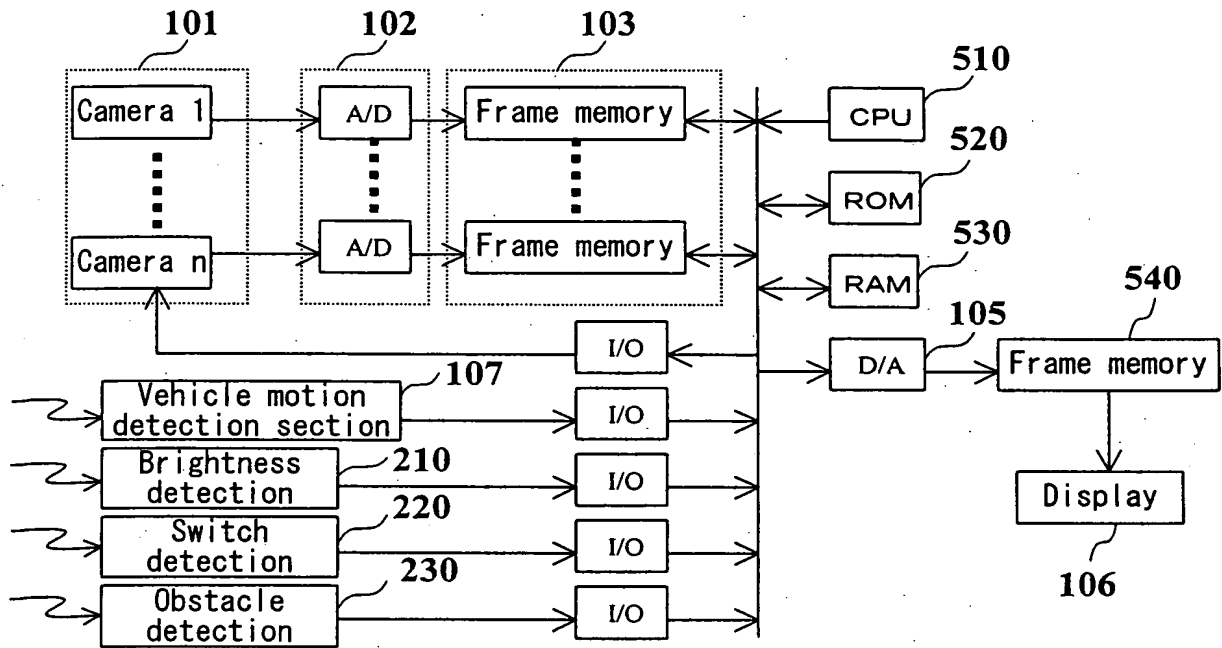


FIG. 20B



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FIG. 21



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FIG. 22A

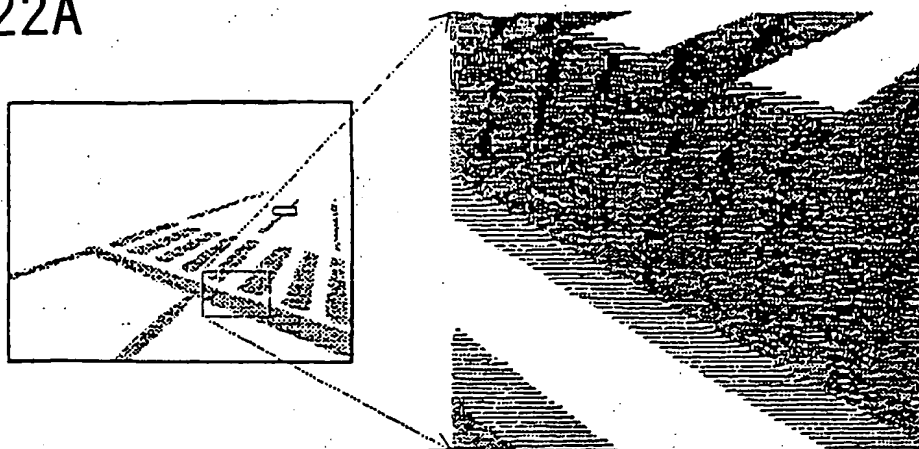
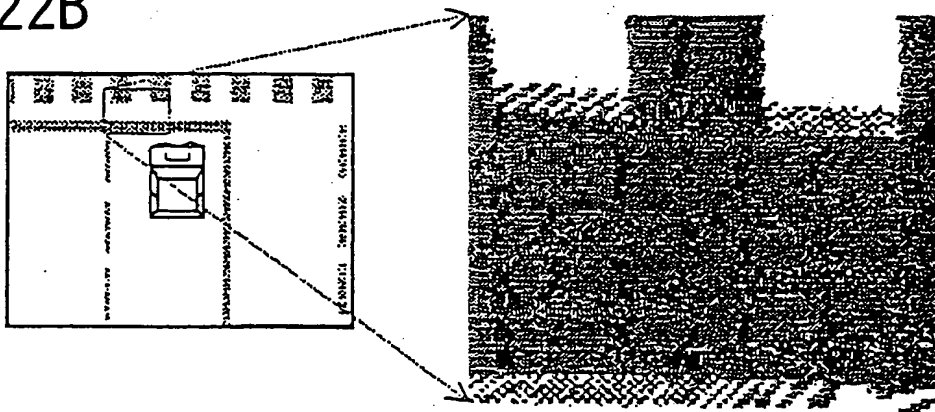
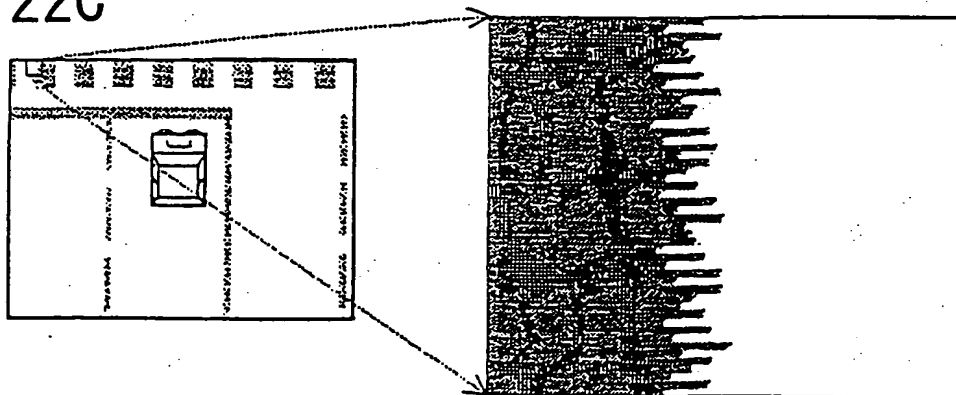


FIG. 22B Input image when a vehicle is moving (Camera 3)



Synthesized image per frame (the vehicle is moving)

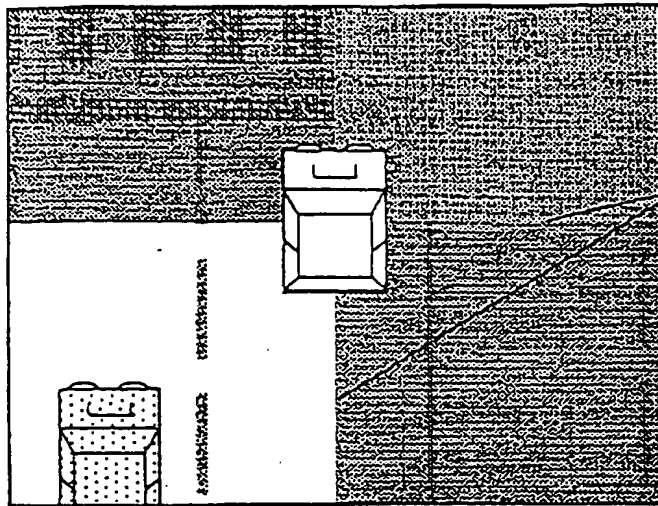
FIG. 22C



Synthesized image per field (the vehicle is standing still)
(Example 1 of prior art problems)

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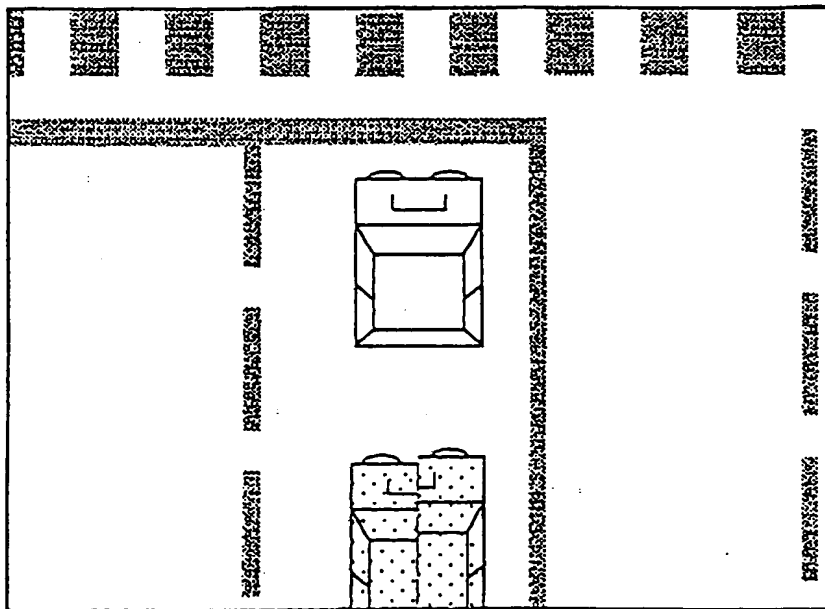
FIG. 23A



Junctures of images appear unnatural due to difference in brightness and tint with cameras

Nonmatching in brightness and tint

FIG. 23B



Displacement of images
(Example 2 of prior art problems)